

Assumptions:

1. The book class number system:

This library applies the 23rd version of the Dewey Decimal Classification (DDC). This classification system is used in 200,000 libraries in at least 135 countries.

100	Philosophy and psychology
200	Religion
300	Social sciences
400	Language
500	Pure Science
600	Technology
700	Arts and recreation
800	Literature
900	History and geography

Based on the DDC system, the specific class of all the sample books in this coursework is as follows:

ITEM_NAME	CLASS_ NUMBER
Algorithms	000
Fundamentals of Database Systems	000
Sophies World	100
Fundamentals of Economics	300
Spanish for Beginners	400
Organic Chemistry	500
One Hundred Years of Solitude	800
The Great Gatsby	800
To Kill a Mockingbird	800
The Renaissance	900
Titanic	700
Adele 21	700
Billie Jean MV	000
Python Lecture Recordings	000

2. Library structure

This library has three floors, the corresponding numbers of the floors are 1, 2, 3. Each floor is assumed to have 10 bookshelves. All items are placed in descending order by class number and then alphabetically by initials.

All books are located on the 1st and 2nd floors, while all the DVDs, CDs and videos are placed on the 3rd floor. The 1st floor contains books from class number 000 to 400, and the 2nd floor contains books from 500 to 900.

1st floor	Books: 000, 001, 002, 003, 004
2nd floor	Books: 005, 006, 007, 008, 009
3rd floor	DVDs, CDs, videos

3. Numbering rules

We designed 4 types of numbering in this library system: Member ID, Item ID, Loan Record Number and Reservation Record Number. All consist of 10 digits.

For the member ID, the first digit indicates identity. Specifically, number 1 means students and 2 means staff. The second to sixth digits indicate the date of registration in the system. The last three digits are their individual number.

For item ID, the first digit indicates the type of item. Specifically, number 1 means books, 2 means DVDs, 3 means CDs, and 4 means videos. The second digit indicates the corresponding floor number, the third digit means the shelf number, the fourth to sixth digits indicate the class number, the seventh and eighth digits indicate the item name, and the last two digits indicate the number within the item of the same name.

e.g., An item with an ID 1184002503, means that it is a book, and is placed on the 8th shelf on the 1st floor, the class number is 400. The book's name is 'Spanish for Beginners', and this book is numbered 03 among copies of the same name.

For loan record number and reservation number, the first 8 digits mean the date, in the order of month, day and year. And the last two digits mean the serial number on this day.

4. There is no upper limit of total fine or fine for each item, the fine will still be growing after the account has been suspended.

5. Date "today":

The "today" date in this database is 9th December 2022, which is used to calculate the number of days to expire.